General Notes.

GEOLOGY AND PALEONTOLOGY.

American Devonian Fishes found in Belgium.—An examination of M. Lohest's collection of Devonian fishes at Liege by Mr. Newberry has brought to light the following interesting facts:

Among the specimens collected in the macignos of Ouppet near the upper part of the sands of Condroz, Mr. Newberry recognized the bony plates of the head of a fish of the genus Dinichthys, which, until now, was found only in America. The genus Dinichthys was created by Newberry for a gigantic fish, with a head a meter in length, having the body like that of Coccosteus covered with bony plates.

Of the specimens recognized by Newberry one was referred to *D. pustulosus*, while the others seemed to be closely allied to the American species, *D. terrilli.*

These fossils were found at Ouppet in a calcareous macigno rock, associated with *Spirifer disjunctus* and also with the palatine teeth of Dipnoans, of which two species, *Dipterus flabelliformis* and *D. nelsonii*, are American types.

The paleontological interest of the presence of Dinichthys in the Devonian of Belgium is increased by the fact that in America these huge creatures are found in a rock analogous to that of Ouppet, associated with the same *Spirifer* and the same *Dipterus.*

In America, also, these fossils are found in a Chemung stratum which is separated from the Lower Carboniferous by a bed of Catskill sandstone containing *Holoptychius americanus*, a species related to the Holoptychius of the famennien of Belgium.

Another Devonian fish described by M. Lohest and referred by him to the genus Bothriolepis, was found near Chèvremont. The fossil shows the head, the swimming organs, and the dorsal plates. It appears to be closely related to *B. canadensis* from the Upper Devonian of Scammenac Bay, Canada.

The discovery in the sands of Condroz of species closely related, if not identical, with American species, confirms the view now generally adopted as to the famennien age of the Chemung and Catskill beds.—Ann. Soc. Geol. de Belgique, Tome xvi.

The Geology of Borneo.—Posewitz treats of the geology of Borneo under four heads: (1) The Mountain-land; (2) The Tertiary Hill-land; (3) The Drift of the Plains; (4) The Alluvium of the Marshes.

The mountain-land consists of crystalline schists, old eruptive rocks, and a slate formation that may be Devonian, overlaid by a carboniferous formation of hard, bluish limestone, succeeded by coarse white sandstones. This carboniferous formation is clearly marked off from the tertiary beds that succeed it.

Cretaceous rocks have been discovered in West Borneo by Van Schelle, the fossils of which have been referred by Geinitz to the Upper Chalk.

The hill-land forms a belt around the mountain-land. It rises into hills (Eocene) near the mountain border and dies away into the common level of the plains (Miocene).

Verbeck divides the Eocene of Borneo into three stages: (a) Sandstone, (b) marl, and (c) the limestone. Of these the sandstone stage is the most important since it contains the Borneo black coal. The marl stage is very fossiliferous, one bed being literally packed with Orbitoides and Nummulites. The limestone stage appears to be the equivalent of the Nummulitic Limestone of Europe.

The eocene strata are pierced in numerous places by the eruption of andesitic lavas probably of miocene age. These lavas are bedded and accompanied by tuffs. Above the andesites lie a series of shales and limestones described by Verbeck as miocene.

The drift of the plains forms a zone round the hill-land, and also covers the flanks of the mountains. It contains the chief deposits of gold, platinum, and diamonds.

The alluvium of the marshes has a wide distribution, owing to the very gradual rise of the land from the coast.

Wallace regards the Malay Archipelago as having been produced by the breaking up of a continental area; Posewitz, on the contrary, describes Borneo as resulting from the fusion of an archipelago of small islands, the grouping of which has been preserved in the main features of the present structure.—Natural Science, April, 1892.

Phosphates and Marls of Alabama.—The interest in the natural fertilizers of the State of Alabama has led Mr. E. A. Smith, the State geologist, to publish a separate bulletin upon the subject in advance of the general report upon the cretaceous and tertiary formations.

The subject is treated with the characteristic thoroughness of the author. The geological age, mode of occurrence, composition, and probable origin of the phosphates are given, followed by remarks on the calcareous marls. The paper closes with a dissertation on the economical relations of the phosphates. Phosphatic marls have been found at the base and summit of the rotten limestone of the cretaceous formation, and in the lignitic, white limestone and Claiborne group of the tertiary. They are not of so high grade as those of South Carolina, but resemble more nearly those of New Jersey. This the author considers to be advantageous to the State. If they are not rich enough to export there is more probability of their use at home; and the enhancement in the value of the lands and the increase in the crops due to their use will represent a larger amount of capital than would the trade in the exported rock.

Keyes' Mississippian Section.—Mr. Charles Keyes substitutes the term Mississippian for Lower Carboniferous as applied to certain rocks of the Mississippi Valley, and tabulates them as follows:

Mississippian Series.	Kaskaskia group.....	Chester shales.
		Kaskaskia limestone.
		Aux Vases sandstone.
	St. Louis group.....	Ste. Genevieve limestone.
		St. Louis limestone.
		Warsaw limestone (in part; not typical).
	Osage group.....	Warsaw shales and limestone.
		Geode bed.
		Keokuk limestone.
		Upper Burlington limestone.
		Lower Burlington limestone.
	Kinderhook group.....	Chouteau limestone.
		Hannibal shales.
		Louisiana limestone.

Bull. G. S. A., Vol. 3, 1892.

Geology of the Crazy Mountains.—A description recently published by J. E. Wolff gives some interesting features of the Crazy Mountains of Central Montana. They form an isolated range of the Rocky Mountains rising to the height of 11,000 feet above sea level. A branch of the Yellowstone River has cut a transverse valley, dividing the range into northern and southern halves.

The range lies in a region of nearly horizontal cretaceous rocks. The southern half is characterized by a basin structure, the interior of which is interrupted by dome-shaped uplifts of dioritic stock. The

dioritic stock as well as the adjacent cretaceous rocks, are cut by later vertical dykes having a general radial arrangement with the dioritic mass as an approximate center. In the northern half longitudinal uplifts produce long-crested ridges. The eruptive rocks, like those of the southern area, are younger than the enclosing strata. The dykes are innumerable; in one place a dyke was counted every fifty feet horizontal on a long spur.

The great masses of crystalline rock and the honey-combing of the soft strata by dykes has enabled this range to resist the erosion which has levelled the adjoining country and made it what Warren Upham calls a good example of "an eroded mountain range."—Bull. A. G. S., Vol. 3, 1892.

Geological Survey of New Jersey, 1891.—The work accomplished by the State Geologist and his assistants during the past year is reported by Mr. Smock as follows:

A study of the surface or pleistocene formations of the northern part of the State, by Prof. Salisbury; (2) an examination of the oak-land and pine-land belts of the State, by C. W. Coman; (3) a continued study of the water-supply and water-power, and (4) in co-operation with the United States Geological Survey, a study of the crystalline rocks of the highlands of northern New Jersey.

Some notes on the active iron mines and on artesian wells have been collected.

Numerous maps and charts accompany the report.

A Hyena and Other Carnivora from Texas.—At a meeting of the Philadelphia Academy Prof. Cope stated that he had during the past season while exploring the eastern front of the Staked Plains of Texas with the party of the Geological Survey of that State under Prof. W. F. Cummins, obtained the remains of some interesting carnivora from the Blanco or Pliocene beds. One of these is a hyena nearly allied to the genus Hyæna, and the first species of this family found in America. It, however, differs from the typical genus in having a fourth premolar in the lower jaw, and probably in having a shorter blade of the sectorial tooth in the upper. He proposed the name Borophagus for the genus, and for the species the name *diversidens*. The third lower premolar is very large and robust, greatly exceeding the fourth in dimensions. The latter is low and molariform; the inferior canine is large. The measurements are as follows: Transverse diameter of canine alveolus, 13 mm.; do. of posterior alveolus of pm.

iii, 13 mm.; diameters of pm. iv; longitudinal 4 mm.; anteroposterior, 10; transverse, 8. Diameters of pm. iii; longitudinal, 17 mm.; anteroposterior (partly restored), 28; transverse, 15. The species is as large as the spotted hyena, and was the scavenger of the Blanco Fauna.

Another interesting carnivore is a weasel of a new genus and species, which it was proposed to call *Canimartes cumminsii* after its discoverer. The genus *Canimartes* is allied to *Mustela*, differing only in the presence of two superior true molars. Metaconid of inferior sectorial well developed; talon of the same trenchant. The species is as large as the fisher.

A third carnivore is a cat, provisionally referred to the genus Felis under the name of *F. hillianus*, after Prof. Robert T. Hill, the well-known geologist. This cat is about the size of the cheetah, and has large canine teeth without grooves, and the feet are shorter than in modern cats.—E. D. COPE.

Geological News, General.—Mr. Hilgard's notes on the Cienegas of California show them to be of considerable economic importance. A cienega is a limited area showing a growth of water-loving plants, appearing sporadically in otherwise arid surroundings. Observation shows this area to be a débris fan or cone, having its apex near the mouth of a cañon. The débris consists of alternate deposits of rounded gravel and cobble, fine silt, and even clay. These deposits form a natural storage reservoir for the flood waters of the cañon, annually replenished, provided an open cobble surface is maintained at the apex of the cone. The conditions necessary for cienega formation are fulfilled in the granitic ranges of southern California.

Lee Lake, which furnishes the water supply of the "South Riverside" colony in the Valley of Temescal Creek is an exemplification of the value of the Cienega formations. This lake is fed entirely by an almost continual ooze from the masses of débris that have accumulated in front of the two uppermost cañons of the Temescal Valley.—Bull. Geol. Soc. Am., Vol. iii.

Archean.—The conclusions reached by Mr. N. H. Winchell in regard to the occurrence and distribution of the Mesabi iron ore of Minnesota are that no theory has yet been proposed that is satisfactory, and the one cause acting with sufficient force on a geographical area sufficiently wide to which appeal can be made for the geographic and stratigraphic distribution of this ore, is *oceanic sedimentation*.—

Am. Geol., Sept.. 1892.—Prof. F. W. Hutton is inclined to think that the Foliated rocks of Otago belong to the archean rather than the paleozoic era. The absence of plication and of cleavage oblique to the stratification throughout the district are sufficient proofs that the foliation is not due to crushing or dynamic metamorphism, while it cannot be considered as a region of contact metamorphism, for the only eruptive rocks are those near Queenstown, and they have been foliated along with the rest. The metamorphic action would, therefore, appear to be due to the internal heat of the earth at a very early period of its history, when the temperature gradient was much steeper than it is now.—Trans. New Zealand Inst., Vol. xxiv.

Paleozoic.—In his notes on the Devonian Fish-Fauna of Spitzbergen, Mr. A. Smith Woodward confirms the views published by Prof. Lankester that two distinct horizons—an upper and a lower—are recognizable in the Devonian formation of Spitzbergen.—*Ann. and Mag. Nat. Hist.*, 1891.——Mr. Walcott has obtained data which establish the fact that during the Middle Cambrian there was an immense deposition of sediments that now form a series of shales and limestones nearly 3000 feet in thickness. The fauna of Middle Cambrian time in Tennessee is essentially the same as that of the basal deposits about the Adirondack Mountains, the upper Mississippi Valley areas of Wisconsin and Minnesota, those about the Black Hills of Dakota, and the Llano Hills of Texas.—*Am. Jour. Science*, July, 1892.——Mr. C. A. White agrees with Mr. T. W. Stanton in his conclusion that the Bear River formation is not equivalent to the Laramie, but that it occupies a position beneath the greater part of the equivalent of the Colorado formation of the marine cretaceous series.—*Amer. Jour. Sci.*, Vol. xliii.——Paleontologists are indebted to W. H. Sherzer for a monograph of the genus Conophyllum. So vague have been the old definitions of the genus that in the ten species thus far assigned to Conophyllum there are at least five different genera represented.—Bull. G. S. Am., Vol. iii, 1892.

Mesozoic.—A Cretaceous Flora has been discovered in the Holma sandstone, southern part of Sweden. The fossils consist of silicified trunks in place, some small twigs and well preserved pine cones. Two of the species discovered are new, and have been named *Pinus nathorstii* and *Cedroxylon ryedalense*. Dr. Conwentz has fully described both their external characters and their internal structure in a paper recently published in Kongl. svenska Vetenskaps Akademiens.——Mr. Dumble includes under the name Reynosa a series of deposits

occurring in Western Texas and extending into Mexico. They overlie the Fayette sands and consist of gravel cemented by a very porous tufaceous limestone. In some places only the limestone is present. It contains such fossils as *Bulimus alternatus* Say, and seems to be in part the equivalent of the Equus beds of southwestern Texas described by Leidy and Cope.—Bull. Geol. Soc. Am., Vol. iii, pp. 219–230.——Part 4 of Contributions to Canadian Micro-Paleontology has been published by the Canadian Geological Survey. It consists of descriptions and illustrations of thirteen new and three previously known species of Radiolaria from the upper cretaceous rocks of northwestern Manitoba. The report was prepared by Dr. D. Rüst, of Hanover, Germany, who has made a life study of fossil Radiolaria.

Cenozoic.—A fine series of mandibles of *Phascolomys mitchelli* in the Queensland collection supports the view of Mr. DeVis that *P. mitchelli* and *P. platyrhinus* are distinct species. The same writer also affirms that *Sceparnodon* is not a synonym of *Phascolonus*, basing his assertion upon a study of the upper and lower incisors of *Sceparnodon*. —Proceeds. Linn. Soc. N. S. W., Vol. vi.——Mr. Lydekker has recently described and figured a Sirenian Jaw from the Oligocene of Italy. Some peculiarities of dentition appear to him to point clearly to an Artiodactyle ungulate ancestor with short crowned and selenodont molar teeth. This presumed origin has been urged by zoologists, but until now there has been no accepted proof of their derivation; nor is it likely that any such will ever be found.—Proceeds. London Zool. Soc., 1892.——The discovery in Queensland of a second species of Owenia establishes the validity of that genus. Mr. C. W. DeVis proposes, since the name *Owenia* is preoccupied, to substitute for it the name Euowenia.—Proceeds. Linn. Soc., N. S. W., Vol. vi.——According to Lydekker *Viverra hastingsiæ*, described by Mr. Wm. Davies, from the upper eocene of Hordwell, is specifically inseparable from *V. angustidens*.—Quar. Jour. Geol. Soc., Aug., 1892.